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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

re application: Baranda, et al.

Serial No.: 10/010,937

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Group Art Unit: 3682

Examiner: Charles, Marcus

For: ELEVATOR BELT ASSEMBLY WITH NOISE AND VIBRATION REDUCING GROOVELESS JACKET ARRANGEMENT

APPEAL BRIEF

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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant now submits its brief after having filed a Notice of Appeal on November 26, 2004. Payment of $500.00 is made by the enclosed Credit Card Payment Form.

Introduction

The §102 rejection that is the subject of this appeal must be reversed because there is nothing within the cited reference that provides a basis for finding individualized tension on cords within an elevator belt assembly. There is nothing within the reference or the other art of record to support the Examiner's position that the claimed cord tensioning on an individual cord basis is somehow inherently disclosed in the cited reference.

Real Party in Interest

Otis Elevator Company, which is the assignee of this application, is the real party in interest. Otis Elevator Company is a business unit of United Technologies Corporation.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of the Claims

The Examiner has already allowed claims 14, 21-23 and 26-27. Additionally, the Examiner has already admitted that claims 5-8 and 17-18 contain allowable subject matter. Those claims are not the subject of this appeal.

Claims 1-4, 9, 15, 16, 19 and 20 stand rejected under 35 U.S.C. §102.

Claims 10-13 and 25 have been cancelled.

Status of Amendments

There are no unentered amendments.

Summary of Claimed Subject Matter

This invention generally relates to load bearing members such as flat belts used for moving and supporting an elevator car and counterweight within an elevator system. This invention relates to a unique load bearing member and unique method of making a load bearing member, which avoids drawbacks associated with conventional belt-making technologies.

Independent claim 1 recites:

> 1. A method of making an elevator belt assembly having a plurality of cords within a jacket, comprising the steps of:
>
> (a) aligning the plurality of cords in a selected arrangement;
>
> (b) applying a selected jacket material to the cords to encase the cords in the jacket with a generally smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and
>
> (c) maintaining a selected tension on each of the cords on an individual cord basis while applying the jacket such that the tension on the

cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly.

Figure 4 schematically illustrates a method of making an example belt assembly 40 (see Figure 2) that includes a plurality of cords 42 and a jacket 44. A cord supply 50 provides the cords 42, which may be maintained on a plurality of spools, for example. (Paragraph 32, page 7).

A positioning device 52 aligns the cords 42 in a desired alignment so that the cords 42 will extend parallel to a longitudinal axis of the belt assembly 40. A tensioning device 54 controls an amount of tension on the cords 42 during the jacket application process. (Paragraph 34, page 8).

In this example, the tension on each individual cord 42 is maintained at a desired level throughout the process of making the belt assembly so that the belt configuration or geometry is controlled as much as possible. The tension on each individual cord 42 may be different with respect to the other cords. In one example a base tension of approximately 50 Newtons is placed on each cord and a sample belt assembly is made. The sample belt assembly then is inspected to make sure that the geometry is as desired. If there are undesirable variations, such as a slight curvature, the tension on one or more individual cords is adjusted relative to the tension applied to other cords to address the undesirable belt geometry variation. One example implementation includes making several samples, taking measurements and making adjustments to determine the necessary individual cord tensions that yield the desired belt geometry. (Paragraph 35, page 8).

It is noteworthy that the disclosed example eliminates cord supports in the jacket application portion of the manufacturing process and, therefore, the tensions on the cords are

used to maintain the horizontal positions of the cords (as seen in Figures 2, 3 and 5, for example) the same throughout the jacket application process. (Paragraph 36, pages 8 and 9).

Conventional practice included using a cord support having a plurality of ridges that the cords would rest upon during a jacket application process. Such processes would result in a configuration as schematically shown in Figure 1, which includes a plurality of grooves formed on one side of the belt corresponding to the side where the cords supports supported the cords. Because the cords were supported in that manner, controlling individual tensions on the individual cords to maintain a belt geometry was not necessary. With this invention, the undesirable resulting grooves in the jacket can be eliminated. To achieve a desired, controlled belt geometry, individually controlled cord tensions provide for controlling the position of the cords within the jacket in the absence of cord supports.

Claim 2 recites that different tensions are maintained on different ones of the cords.

Claim 3 depends from claim 1 and recites the steps of making a sample belt assembly; inspecting the sample belt assembly; determining whether a configuration of the sample belt assembly is consistent with a desired configuration; and adjusting the tension maintained on at least one of the cords when the determined configuration is not consistent with the desired configuration.

Independent claim 15 is a product by process claim:

> 15. An elevator belt assembly made by the process, comprising the steps of:
> (a) aligning a plurality of cords in a selected arrangement;
> (b) applying a selected jacket material to the cords to encase the cords in the jacket with a smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and
> (c) maintaining a selected tension on each of the cords on an individual cord basis while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the smooth, uninterrupted surface on the jacket along the length of the belt assembly.

Claim 16 depends from claim 15 and includes maintaining different tensions on different ones of the cords.

Claim 24 is an independent claim that recites:

> 24. A method of making an elevator belt assembly having a plurality of cords within a jacket, comprising the steps of:
>
> (a) aligning the plurality of cords in a selected arrangement;
>
> (b) applying a selected urethane jacket material to the cords to encase the cords in the jacket with a generally smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system;
>
> (c) maintaining a selected tension on the cords, respectively, while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly; and
>
> (d) using a molding device that has an opening through which the belt assembly proceeds, the opening comprising a non-linear configuration such that a thickness of the jacket exiting the opening varies across the width of the jacket.

In addition to maintaining the selected tension on the cords, respectively, claim 24 reads on using a molding device as shown in Figure 6. In that example, the opening 80 of a molding device 70 has a non-linear configuration along the portions of the opening that form the surfaces 46' and 48' of the jacket 44. The example non-linear configuration provides for differences in the thickness of the belt assembly as seen across the width at least at that stage of the assembly process. (Paragraph 49, page 11).

The varying, non-linear configuration of the surfaces 46' and 48' as shaped by the opening 80 are designed to accommodate the variation in the amount of shrinkage across the width of the belt that will occur during the finishing and curing of the belt assembly. In the areas where cords 42 are present, there will be less shrinkage, for example, because of the presence of the cord material. In some examples, the cord material comprises steel. The portions of the belt assembly where no cords are present (i.e., the portions that provide the spacing between the

cords) temporarily have a greater thickness because there will be more shrinkage at those locations. (Paragraph 50, pages 11-12).

Varying the thickness across the width of the assembly facilitates achieving a final resulting flat, parallel alignment between the surfaces 46 and 48 of the jacket 44. There is nothing in the art that expressly or inherently discloses or even suggests this approach for achieving a flat belt surface.

Grounds of Rejection to be Reviewed on Appeal

Claims 1-4, 9, 15, 16, 19, 20 and 24 were rejected under 35 U.S.C. §102(a) as being anticipated by WO 01-14630 ("the *Prewo* reference").

Argument

There is no anticipation. The Examiner admits that there is nothing in the *Prewo* reference that expressly discloses maintaining a selected tension on each of a plurality of cords on an individual cord basis while applying a jacket such that the tension on the cords controls positions of the cords within the jacket. The Examiner has stated his position as follows, "Note each cord is spaced apart and have different sizes composed of different materials. Therefore, it is apparent that the cords are maintained individually." Even though the *Prewo* reference does have embodiments where cords are different sizes and they are spaced apart, there is nothing about the teachings of that document that inherently discloses maintaining individualized tension on those cords.

Conventional wisdom has been to use a plurality of cord supports during a jacket application process. Those cord supports control the position of the cords within the jacket. Therefore, there was no need to use individualized tensions on an individual cord basis such that one could control the position of the cords within the jacket. There is nothing about the *Prewo* reference that inherently discloses departing from the conventional wisdom.

Only Applicant's teachings disclose departing from the conventional process, eliminating cord supports, and using individualized cord tension control to achieve a desired position of the cords within the jacket.

At one point the Examiner referred to two other documents as supporting his position that "maintaining a tension in each individual cord is old and well known in the art." The Examiner refers to U.S. Patent No. 3,608,605 and the Japanese publication 55-152037 in this regard. The U.S. '605 patent refers to retreading tires and providing a crisscross arrangement of fiberglass reinforcement cords within the retread rubber of the tire. Applicant respectfully submits that that is non-analogous art as retreading a tire does not present the same issues as making an elevator load bearing member. Moreover, the teachings of that patent regarding handling the tread reinforcing cords is as follows:

> A plurality of single-cord serving packages 15 are provided on a support stand 16 radially spaced from the tire building machine, from which the individual cords 6 are passed through a system of guide eyes 17 and individual adjustable tension controlling devices 18 which allow the individual cords to be drawn from the packages at different rates of speed to provide the different cord lengths required for uniform feed rotation of the tire being wrapped. Since the buffed surface 5 of the tire 1 is slightly round in cross-section, it will be apparent that the cords which are wrapped around the center of the buffed tire will be drawn forward at a greater rate of speed than the cords wrapped around the outside portions of the buffed tire surface. (Column 6, lines 8-21).

The teachings of the '605 patent do not support an argument that the *Prewo* reference inherently discloses maintaining tension on an individual cord basis such that the position of the cords within the jacket can be controlled. Instead, that patent only teaches individual tension controlling devices that are adjustable to allow different lengths of cords to be withdrawn for wrapping around a tire having a crowned or rounded cross section. Because a flat elevator belt does not have a crowned or rounded cross section, by design, the approach in that patent is useless and cannot be considered inherently disclosed within the *Prewo* reference. Further, the '605 patent

cements the cords to the buffed surface 5. Therefore, any tension control is not "such that the tension on the cords controls positions of the cords" nor are the '605 cords "uniformly spaced" from surfaces on the tire.

Applicant does not have a translation of the Japanese document and the Examiner has not pointed to any particular portion of that document to support his argument. Even if individual spools are provided to supply individual cords, that does not in any way equal maintaining tension on cords on an individual cord basis such that the position of the cords within a jacket is controlled.

There is nothing within the art that suggests Applicant's claimed technique for controlling the position of cords within an elevator load bearing assembly such as a flat belt.

CLAIMS 1, 9, 15, 19 AND 20 STAND TOGETHER AND ARE PATENTABLE SEPARATELY FROM ALL OTHER CLAIMS

As noted above, the Examiner admits that the *Prewo* reference does not expressly disclose maintaining tension on a plurality of cords on an individual cord basis such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly. Further, as noted above, there is no basis to find that somehow inherently disclosed in the *Prewo* reference. Therefore, claim 1 (and its dependents) and claim 15 (and its dependents) cannot be considered anticipated.

CLAIMS 2 AND 16 STAND TOGETHER AND ARE PATENTABLE SEPARATELY FROM ALL OTHER CLAIMS

Claims 2 and 16 each include maintaining different tensions on different ones of the cords. This is nowhere expressly or inherently disclosed in the art. Even if it were reasonably possible to somehow find tension maintained on an individual cord basis for controlling the positions of the

cords within a jacket from the teachings of the *Prewo* reference which Applicant disputes, there is no possible stretch of such an allegedly inherent teaching that could reasonably go as far as teaching maintaining different tensions on different cords. As claimed, different tensions on different cords controls the positions of the cords within the jacket. There is simply nothing within the art to even remotely hint at what is claimed in claims 2 and 16.

CLAIMS 3 AND 4 STAND TOGETHER AND ARE PATENTABLE SEPARATELY FROM ALL OTHER CLAIMS

Claim 3 recites steps of making a sample belt assembly using the steps of claim 1. Claim 3 also includes inspecting the sample belt assembly and determining whether a configuration of the sample belt assembly is consistent with a desired configuration. If not, claim 3 provides for adjusting the tension maintained on at least one of the cords to alter the configuration such that a resulting belt assembly will be consistent with the desired configuration. Because the *Prewo* reference never discusses individualized tension control, it cannot possibly be strained to somehow support a finding of inherently teaching the process recited in claim 3. There is no possible anticipation of claims 3 and 4.

CLAIM 24 STANDS ALONE AND IS PATENTABLE SEPARATELY FROM ALL OTHER CLAIMS

Claim 24 includes, in part, "using a molding device that has an opening through which the belt assembly proceeds, the opening comprising a non-linear configuration such that a thickness of the jacket exiting the opening varies across the width of the jacket." Applicant's disclosure is the first that teaches using such an arrangement to achieve a desired exterior configuration of a jacket of a load bearing member for use in an elevator system. There is nothing within the *Prewo* document that discusses curing or shaping the jacket material that in any way relates to the subject

matter of claim 24. There is nothing within the art to support an argument that the *Prewo* reference somehow inherently discloses what is claimed in claim 24. There is no anticipation.

CONCLUSION

There is no anticipation of any of Applicant's claims. The claims that remain rejected under 35 U.S.C. §102, should be allowed along with the other claims that the Examiner has already properly indicated as being allowed and allowable. The rejection based upon the *Prewo* reference must be reversed.

Respectfully submitted,

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January 26, 2005
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CERTIFICATE OF MAIL

I hereby certify that the enclosed **Appeal Brief** is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Mail Stop AF, Commissioner For Patents, P. O. Box 1450, Alexandria, VA 22313-1450 on January 26, 2005.

Theresa M. Palmateer

APPENDIX OF CLAIMS

1. A method of making an elevator belt assembly having a plurality of cords within a jacket, comprising the steps of:

(a) aligning the plurality of cords in a selected arrangement;

(b) applying a selected jacket material to the cords to encase the cords in the jacket with a generally smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and

(c) maintaining a selected tension on each of the cords on an individual cord basis while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly.

2. The method of claim 1, including maintaining different tensions on different ones of the cords.

3. The method of claim 1, including performing steps (a) through (c) to make a sample belt assembly;

inspecting the sample belt assembly;

determining whether a configuration of the sample belt assembly is consistent with a desired configuration; and

adjusting the tension maintained on at least one of the cords when the determined configuration is not consistent with the desired configuration.

4. The method of claim 3, including repeating the steps of claim 3 until the sample belt configuration is consistent with the desired configuration.

5. The method of claim 1, wherein the jacket material comprises a waxless urethane.

6. The method of claim 5, wherein step (B) includes using a molding device and including cooling at least one of the jacket material or the molding device as the applied jacket and the cords exit the molding device.

7. The method of claim 6, including applying a fluid to the jacket material or the molding device.

8. The method of claim 1, including using a molding device and wherein the molding device has an opening through which the belt assembly proceeds, the opening comprising a non-linear configuration such that a thickness of the jacket exiting the opening varies across the width of the jacket.

9. The method of claim 1, including finishing the exterior of the jacket by forcing the jacket into a shaping device that ensures that the jacket exterior has a desired configuration and cooling the belt assembly.

10 - 13. (Cancelled)

14. An elevator belt assembly, comprising:

a plurality of cords aligned generally parallel to a longitudinal axis of the belt along a length of the belt; and

a jacket over the cords, the jacket including a generally smooth, uninterrupted exterior surface extending along the entire belt length that is adapted to contact other components in an elevator system as the belt moves, wherein the jacket comprises a waxless polyurethane.

15. An elevator belt assembly made by the process, comprising the steps of:

(a) aligning a plurality of cords in a selected arrangement;

(b) applying a selected jacket material to the cords to encase the cords in the jacket with a smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and

(c) maintaining a selected tension on each of the cords on an individual cord basis while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the smooth, uninterrupted surface on the jacket along the length of the belt assembly.

16. The assembly of claim 15, wherein the process includes maintaining different tensions on different ones of the cords.

17. The assembly of claim 15, wherein the jacket material comprises a waxless urethane and wherein step (b) of the process includes using a molding device and including cooling at least one of the jacket material or the molding device as the applied jacket and the cords exit the molding device.

18. The assembly of claim 17, wherein the process includes applying a fluid to the jacket material or the molding device.

19. The assembly of claim 15, wherein the jacket material comprises polyurethane and the cords comprise steel.

20. The assembly of claim 15, wherein the process includes finishing the exterior of the jacket by forcing the jacket into a shaping device that ensures that the jacket exterior has a desired configuration and cooling the belt assembly.

21. A method of making an elevator belt assembly having a plurality of cords within a jacket, comprising the steps of:

(a) aligning the plurality of cords in a selected arrangement;

(b) applying a waxless urethane jacket material to the cords to encase the cords in the jacket with a generally smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and

(c) maintaining a selected tension on the cords, respectively, while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly.

22. The method of claim 21, wherein step (b) includes using a molding device and including cooling at least one of the jacket material or the molding device as the applied jacket and the cords exit the molding device.

23. The method of claim 22, including applying a fluid to the jacket material or the molding device.

24. A method of making an elevator belt assembly having a plurality of cords within a jacket, comprising the steps of:

(a) aligning the plurality of cords in a selected arrangement;

(b) applying a selected urethane jacket material to the cords to encase the cords in the jacket with a generally smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system;

(c) maintaining a selected tension on the cords, respectively, while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the generally smooth, uninterrupted surface on the jacket along the length of the belt assembly; and

(d) using a molding device that has an opening through which the belt assembly proceeds, the opening comprising a non-linear configuration such that a thickness of the jacket exiting the opening varies across the width of the jacket.

25. (Cancelled)

26. An elevator belt assembly made by the process, comprising the steps of:

(a) aligning a plurality of cords in a selected arrangement;

(b) applying a waxless urethane jacket material to the cords using a molding device and cooling at least one of the jacket material or the molding device as the applied jacket and the cords exit the molding device to encase the cords in the jacket with a smooth, uninterrupted surface on an exterior of the jacket that is adapted to contact sheaves in an elevator system; and

(c) maintaining a selected tension on the cords, respectively, while applying the jacket such that the tension on the cords controls positions of the cords within the jacket and the cords are uniformly spaced from the smooth, uninterrupted surface on the jacket along the length of the belt assembly.

27. The assembly of claim 26, wherein the process includes applying a fluid to the jacket material or the molding device.

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